Summary of Projects Completed During Federal Fiscal Year 2003

Agriculture Sector – Agricultural Best Management Practice (BMP) Effectiveness Field Guide

CONTRACT #S067

Location and Background

The intent of this statewide project is to develop an agricultural BMP effectiveness guidance document for in-field monitoring and evaluation. The document will be available for use by field staff from numerous local, state, and federal agencies.

Over twenty years ago, in December of 1981, a memorandum was developed to initiate the implementation of a standard process for evaluating the impact of Best Management Practices on water quality. Signed by the administrator of the Department of Environmental Quality (DEQ), administrative officer of the Idaho Soil Conservation Commission (ISCC), and the State Conservationist of the Soil Conservation Service (SCS), this document was the first attempt to officially implement BMP effectiveness monitoring and evaluation within Idaho's state Agricultural Water Quality Program.

However, little attention was paid to BMP effectiveness until 1990, when DEQ published *The Coordinated Nonpoint Source Water Quality Monitoring Program for Idaho*. This document outlined monitoring and evaluation responsibilities for designated agencies, naming ISCC as the lead state agency for development, implementation, and evaluation of agricultural BMPs. The publication recommended objectives for BMP effectiveness evaluations, emphasized the need for interdisciplinary teams, discussed potential timing, and recommended frequency of evaluations, operation, and maintenance. Only the grazing/riparian recommendations outlined specific evaluation parameters.

In the years since 1981, BMP effectiveness evaluation efforts have faltered due to limited resources, lack of staffing, and a focus on promotion of BMP implementation, program expansion, and other agency priorities.

More recently, changes in Idaho's Water Quality Law, Idaho Code § 39-3621, state that the ISCC (the designated state agency for agricultural and grazing activities), in cooperation with appropriate land management agencies, is responsible for ensuring agricultural BMPs are monitored for their effect on water quality. In addition, BMP effectiveness evaluation has been recognized as imperative for validation of successful TMDL implementation within the agricultural sector.

Results

In order to fulfill these responsibilities, the ISCC identified a need for a user-friendly BMP effectiveness evaluation field guide, which would present a flexible process with a wide variety of practice-specific protocols and tools. This project produced the following:

- *Idaho Agricultural Best Management Practices: A Field Guide for Evaluating BMP Effectiveness.* This field guide has been disseminated amongst ISCC field staff, Idaho Association of Soil Conservation Districts (IASCD) field staff, state and federal partners, and the University of Idaho. The document has also been made available electronically via the ISCC website: http://www.scc.state.id.us/PDF/BMP Effectiveness Guidance Document.pdf. Copies are also available in hardcopy.
- Training modules have been developed for classroom presentation and hands-on field application.
- Beginning in 2004, TMDL implementation annual progress reports based on BMP effectiveness field evaluations will be submitted to the ISCC Commissioners, IASCD Division Directors, and DEQ Regional Offices.

Agricultural Sector – Bear River Fencing Project

CONTRACT Q609

Location and Uses

This agriculturally related project is located in the community of Thatcher, Franklin County, in southeastern Idaho. The legal description is: Thatcher 7 ? minute quadrangle, Township 12 South, Range 40 East, NE ?, SW ?, Section 1.

Impairments

Idaho's §303 (d) list identifies the pollutants on this segment of the Bear River as flow alteration, nutrients, and sediments. The project addressed the following concerns of nutrients and excess sediments:

- Declining fisheries population due to the degradation of spawning and rearing habitat
- Reduced population densities and diversity of aquatic biota
- Declining primary and secondary contact recreation use
- Increased operation and maintenance costs due to sediment deposit on roads, in canals, under bridges, and in culverts
- Crop yield losses due to erosion
- Reductions in wildlife population and species diversity due to degradation and loss of riparian and wetland habitat
- Reduction in the downstream reservoir capacity

Funded Projects

The purpose of this project was to exclude livestock from the streambanks, creating a riparian corridor that allows the native vegetation to stabilize the streambanks. The resultant riparian community improves the project's wildlife habitat and the water quality in the Bear River downstream of the project area. Goals for this project included the following:

- Reducing stream bank erosion and nutrient loading
- Improving the riparian habitat and creating a wildlife corridor
- A livestock-grazing plan was planned and implemented by the ranch foreman at the direction of the landowners. The plan uses alternate watering sites located away from the river. Proper utilization of this plan will entail that the livestock will be rotated through the range, leaving the grass healthy and able to hold the sediment and nutrients upland. The plan will continue to be monitored and updated as needed.
- Working with the National Resources Conservation Service (NRCS), a fence design was compiled. This design was based on the NRCS standards and specifications for barb fencing. In the spring of 2000, the landowner began installing 16,900 linear feet of fence.
- Through matching funding, an off-stream livestock watering facility was installed, consisting of a well, trough, and pipeline. To further enhance the water quality in the Bear River, 319 funds were used to install 450 linear feet of rock riprap. During construction, willow bundles were interspersed with the rock. When mature these willows will provide shade and improve the wildlife habitat.

Results

A monitoring team visited the site on November 6, 2000 and observed the completed project. The fence is a 5-wire barb with post spacing 12 feet apart and wire stay between posts. The posts are 6-foot steel or 5-foot wood/railroad ties, and three gates are installed in the fence. One water gap, fenced on three sides, is included on the upper section.

Natural riparian revegetation was documented by comparison of the existing plant communities. The stubble height was noted and a percentage of the cover, including the type, was documented.

Silviculture Sector – Cascade Reservoir Watershed Road and Forested Land Final Report

CONTRACTS #Q374, Q443, AND Q558

Location and Uses

Located in central Idaho, near the town of Donnelly, Cascade Reservoir supplies agricultural irrigation water and is a popular recreational area. Some twenty miles long, the lake offers more than eighty miles of shoreline.

Impairments

Cascade Reservoir, Valley County, has been adversely impacted by sediments and nutrients associated with agriculture and residential development for many years. Investigations have determined that much of this contamination initiated from cattle grazing and from roads constructed adjacent to riparian areas. This Forestry Source Plan report discusses results of fieldwork conducted from 1997 through 2002.

Funded Projects

The work funded by three 319 grants, including contracts Q374, Q443, and Q558, was designed to reduce contamination in Cascade Reservoir resulting from grazing and road construction southwest and northeast of the reservoir.

- Sediment and phosphorus reduction was achieved through the following actions:
- Graveling sediment-producing roads and segments
- Graveling road approaches to stream crossings
- Installing cross drainages and permanent rolling dips in existing roads
- Closing roads in riparian areas
- Graveling recreational roads on state park lands adjacent to the reservoir
- Rocking the approach to stream fords
- Rehabilitating a riparian area
- Reviewing and revising the grazing management plans and applying BMPs

Results

The Forestry Source Plan goal for *The Cascade Reservoir Watershed Management Plan Total Maximum Daily Load (TMDL)* is a 45% reduction in sediment/phosphorus inputs from grazing and roads. The work performed under this project accomplished a 62% reduction from forestry management sources and a 52% reduction from grazing sources.

Included in this report is a description of SEDMODL, a computer model designed to predict delivery from roads and streams. The report recommends that DEQ adopt the use of SEDMODL as the method to develop TMDL's on forested lands.

Additional information, including quarterly reports submitted by the project manager and DEQ field inspections conducted by DEQ staff in 2002 and 2003, is available through the DEQ State Office.

Agricultural Sector – Coeur d' Alene Tribal lands Final Report

CONTRACTS QC036600, QC052900, AND S065

Location and Uses

This report summarizes § 319-funded work accomplished near Plummer, Idaho, on Coeur d' Alene Tribal lands, under DEQ grant contract numbers Q0529, Q0366 and SO65. The predominantly agricultural land in the Plummer Creek watershed drains to Coeur d'Alene Lake and covers approximately 2,500 acres.

Impairments

Improper grazing and other agricultural techniques have resulted in denuding of stream banks and creation of near vertical cut banks along the main channel of Hangman Creek, Lake Fork Creek, North Fork Creek and Rock Creek. These streams have become a substantial source of sediment and nutrients to the southern portion of Coeur d' Alene Lake.

Funded Projects

This project consists of six subprojects, including the Lake Creek/Mitchell property, Lake Creek/Akers and Synder property, North Fork Rock Creek Watson property, Plummer Creek wetland, Benewah Creek Johnson property BMPs, and the Hangman Creek/Kitt property. Monitoring on each project varies, but includes annual photographs at select photo points, surveyed stream bank profiles that are resurveyed annually to detect erosion or profile changes, and annual plant survival surveys.

Results

The Plummer Wetland Restoration effort is the most visible and most notable accomplishment of this 319 project. It is located on a decommissioned portion of a lumber mill and log yard owned by the tribe and a nearby electric co-generation plant. The wetland project includes the main wetland pond, inflow and outflow channels, and an observation bridge for public field trips. This project has a very positive impact on the Plummer community as an indicator of the tribe's natural resources restoration program. This site is used for educational programs and is closely watched and maintained, as needed, to ensure its function as a water quality and wildlife improvement project.

Other work included wetland creation, the re-sloping of vertical cut banks along the main channel of Hangman Creek, the placement of erosion control matting and rock barbs to protect the re-sloped banks, and the planting of native grasses, trees, and shrubs to provide further stabilization. Woody vegetation restoration along the Hangman Creek/Kitt property mainstem is considered a key restoration effort. A very important watershed in both Idaho and Washington, Hangman Creek received considerable attention because of widespread degradation.

Other BMPs applied include sediment basins and pond systems that were constructed in the Lake and North Fork Rock Creek watersheds. This work, in conjunction with vegetative plantings, is considered vital in protecting and improving the quality of these drainages. While the use of native plant species does carry a high cost, it is seen to be the only real way of returning these drainages to stable conditions that support the full range of human, fish, and wildlife beneficial uses.

Sediment budget modeling conducted for the North Fork of Rock Creek is considered a very important step in understanding sediment generation and movement across the entire region. The process that was developed will have wide applicability to other drainages through its use of

accepted erosion process equations and its basis in Geographic Information System (GIS) mapping techniques.

This 319 project had a very positive impact on the people of the Coeur d'Alene Reservation—both tribal members and non-tribal residents. The newsletter *Watershed Wrap* is distributed widely throughout this area and is widely read. This 319 project, and other water quality and non-point source issues, were featured in each publication during project construction. There is no doubt that public awareness of the reasons for, and solutions to, water quality and habitat degradation is the only way to achieve a lasting change in the present situation.

Groundwater Sector – Final Summary, Statewide Program, Pesticide Testing

CONTRACT #S050

This project was designed to provide a statewide perspective on the distribution and level of pesticides in ground water. Pesticide analyses, using gas chromatography (GC) analysis methods, were to be conducted on ground water samples collected from 300 of the approximately 400 statewide program wells sampled during the summer of 2002. (The pesticide information from the wells would have augmented the 597 statewide program samples analyzed for pesticides from 1994 through 2000.) The GC pesticide analyses funded by the §319 grant were to be used in conjunction with immunoassay pesticide tests and other analyses to: 1) identify areas with ground water quality problems, 2) help characterize water quality of Idaho's principal aquifers, and 3) direct future regional ground water quality monitoring and ground water quality management activities.

However, due to a fire at the State Health Lab, only samples from 172 sites were analyzed for pesticides using GC techniques (EPA Method 515.2 or 515.3 - chlorinated herbicides and EPA Method 525.2 – organic compounds). The sites analyzed using GC methods are predominantly located in southern Idaho. The lower number of laboratory tests resulted in unspent funds totaling $28,712 out of an original grant of $60,000.

Results of the pesticide analyses include the following:

- Ground water samples from eight of the 172 sites tested contain pesticides, as determined by GC tests.
- Ground water samples from seven sites contained one pesticide (Dacthal) and ground water samples from one site contained two pesticides (Dacthal and 2,4-D). Drinking water standards are not established for these compounds, so the levels were compared to EPA drinking water health advisories.
- No compounds were detected in concentrations above their drinking water health advisories.
- All results are contained in the IDWR Statewide Ambient Ground Water Quality Monitoring Program database and are readily accessible via the IDWR website: http://www.idwr.state.id.us/hydrologic/info/statewide/.

Ground water samples from the 172 GC sites and an additional 220 sites (392 sites total) were analyzed for pesticides using immunoassay tests, in accordance with existing statewide program procedures. Immunoassay testing results indicate ground water samples from 30 sites contained detectable concentrations of pesticides. Samples were tested for *Atrazine, Alachlor, Acetochlor,* and *Metolachlor*, the following results were obtained:

- Atrazine was detected in samples from 18 sites.
- Alachlor was detected in samples from 4 sites.

- Acetochlor was detected in samples from 1 site.
- Metolachlor was detected in samples from 9 sites.
- All concentrations are below drinking water standards or health advisory levels. Atrazine detections are distributed throughout Idaho.
- Overall, low levels of pesticides were detected in slightly less than nine percent of the samples tested for pesticides. Gem County and Franklin Counties had the highest percentage of sites with pesticides: two of the five wells sampled in each county contained a pesticide. Ada County had the next highest percentage of sites with pesticides, with six of 30 sites containing pesticides. In general, the highest frequency of detections was observed in ground water samples collected from southwestern Idaho.

The attached figures and tables summarize the results of the GC and immunoassay pesticide analyses conducted on samples collected from statewide program sites in 2002.

TABLE 1 **Sites where pesticides were detected in 2002**

Station	LatDeca	LongDecb	2,4-D	Acetochlor	Alachlor	Atrazine	Dacthal (DCPA)	Metolachlor
02N 03E 28CAC1	43.47805556	-116.1077778					1.14	
02N 04W 04ADA1	43.54055556	-116.8116667					35.2	
03N 01E 13BDB1	43.59944444	-116.2880556				0.3	0.94	
03N 01E 17ACA1	43.60027778	-116.3602778				0.1		
03N 02E 07ADCB2	43.61319444	-116.2571111				0.11		
03N 02W 04DDAA2	43.62263889	-116.5730278				0.12		
03N 03W 14CDA1	43.59194444	-116.6627778			0.11		1.3	
04N 01E 31DCCD1	43.63397222	-116.3822222				0.28	0.4	
04N 01W 25DCDD2	43.64844444	-116.3996944				0.34	1.5	
04N 02W 22DCD1	43.66333333	-116.5588889						0.07
04N 04W 21CAA2	43.66888889	-116.8222222			0.13			
04N 05W 02CBB1	43.71266667	-116.9093056	1.0				8.19	
04S 07E 20CAA1	43.06027778	-115.6488889						0.19
05N 04W 24ABA1	43.76194444	-116.7591667						0.08
05S 03E 36CAC1	42.94333333	-116.0494444				0.12		
05S 08E 34DBA1	42.94583333	-115.4872222						0.13
05S 17E 25CBCA1	42.95805556	-114.3930556						0.11
06N 03W 10BAA1	43.87916667	-116.6816667				0.2		
07N 02W 30CCC1	43.90888889	-116.6291667			0.1	0.8		
08S 14E 03DBB1	42.761	-114.7991667		0.07				
08S 30E 14ABB2	42.733	-112.9131667				0.8		
08S 39E 06DCB1	42.75388889	-111.9452778				0.06		
09N 05W 26CBB1	44.08916667	-116.9102778				0.07		
10N 44E 10CBA1S	44.20527778	-111.2491667						0.26
10S 13E 25DDC1	42.52138889	-114.8713889			0.16	0.14		
10S 22E 35BCB1	42.515	-113.8513889				0.16		
10S 23E 14CCB1	42.55	-113.7425				0.15		
10S 40E 24BAD1	42.54472222	-111.7302778				0.18		
11N 05W 29CBB1	44.25944444	-116.9725					0.57	
11S 23E 05BDC1	42.4985	-113.7955				0.14		
12S 40E 12CCB2	42.38972222	-111.7377778						0.08
14S 32E 25BDA1	42.17833333	-112.6647222						0.08
15S 40E 20DCB1S	42.10222222	-111.8055556						0.84
55N 02E 03CCB1	48.13944444	-116.2002778				0.06		

LatDec = latitude in decimal format. LongDec = longitude in decimal format.

Agricultural Sector—H17/Snipe Drain TMDL Implementation 319 Project Final Report

CONTRACT S029

Location and Uses

The H17/Snipe Drain, located in south-central Idaho, near the town of Burley (Cassia County), drains into the Goose Creek channel, which discharges agricultural wastewater into the Snake River. The drain, originating approximately six miles south of Burley, meanders through the Burley golf course just prior to emptying into the river. This stretch of the Snake River is referred to as the Milner Pool, a water body included on the State of Idaho's 1998 §303(d) list and addressed in "Lake Walcott Subbasin Assessment and Total Maximum Daily Load" (IDEQ, 1999).

Impairments

The major pollutant of concern in the Milner Pool is phosphorus. The H17 Drain has been assigned a loading of 7.29 pounds per day of phosphorus. The goal of the H17 Drain project is to reduce the phosphorus flowing into the Milner Pool, thereby aiding the agricultural community in meeting the objectives of the Lake Walcott TMDL in reducing nuisance aquatic vegetation. The ultimate goal of this and other similar projects is to keep all water coming off agricultural fields from entering the Snake River.

Funded Projects

Because of its highly visible location (in the golf course), this project is functioning well as a demonstration project, representing one of the many Best Management Practices (BMPs) that can be used to improve water quality, and increase public awareness of the agricultural community's efforts to help clean impaired water bodies.

The project consisted of constructing an earthen berm, or dam, across an existing channel, along with enlargement of the channel, creating a water and sediment control basin on the lower end of the golf course approximately 80 feet upstream of the Snake River.

The Burley Irrigation District and the City of Burley completed the work for the project, with technical assistance provided by the Idaho Soil Conservation Commission, the Idaho Association of Soil Conservation Districts, and the Natural Resources Conservation Service. The project was sponsored by the West Cassia Soil and Water Conservation District.

Behind the new dam, water drains through a vertical pipe when the basin reaches a depth of four feet. The dam halts direct flow into the river, allowing sediment and the attached phosphorus to settle. Reeds, cattails, and water grasses absorb the soluble phosphorous.

Golf course personnel clean the basin on a regular basis. An emergency concrete overflow and valve were installed on the dirt berm, and the disturbed area was seeded to grass.

Urban Runoff Sector – Paradise Creek Urban and Rural Riparian Restoration Projects Final Report

URBAN CONTRACT Q562, RURAL CONTRACT Q605

Location and Uses

The Paradise Creek urban (Contract Q562) and rural (Contract Q605) riparian restoration projects began in 1999 and were completed in 2003. This single closeout report covers both projects, which are contiguous and jointly administered by the Palouse-Clearwater Environmental Institute of Moscow, Idaho. The urban project concentrates on an approximately one-mile stretch of Paradise Creek plus its tributaries within the City of Moscow. The rural project concentrates on over six miles of Paradise Creek and its tributaries north and east of Moscow.

Paradise Creek drains to the Palouse River and ultimately to the Snake River and Columbia River.

Impairments

The entire Paradise Creek watershed north of Moscow drains Palouse geomorphology, consisting of wind-derived, very-fine-grained, volcanic material. Due to this fine-grained, unconsolidated, nutrient-rich, nature, the Palouse is both extremely desirable for farming yet extremely vulnerable to erosion, characteristics that have led to mass erosion of millions of tons of sediment and nutrients from the urban highlands north of Moscow and deposition of that material into Paradise Creek. Subsequent human-caused channeling of Paradise Creek within the City of Moscow has resulted in near vertical head cutting and further mass erosion of sediment.

Funded Projects

All of the sub-projects under the rural and the urban contracts were funded through the NPS 319 grant. Partners and local matching funds came from a wide variety of sources. A partial list of contributors includes the City of Moscow, the Moscow School District, Boy and Girl Scout Troops, Washington State University (WSU) students, University of Idaho students, AmeriCorps National Civilian Community Corps (AmeriCorps*NCCC), and scores of community volunteers.

The urban portion of this multi-faceted operation involves 25 urban subprojects, covering 14,584 feet of stream bank restoration and installation of 11 constructed wetlands, covering 45,152 square feet along Paradise Creek and its tributaries, within the City of Moscow. The work also includes the planting of 5,404 herbaceous plugs and 12,592 woody plants. All of these projects are located on urban public or private land.

Under the rural restoration project, the Palouse-Clearwater Environmental Institute completed 12 urban restoration sub-projects along Paradise Creek and its tributaries, up to six miles north (upstream) of Moscow. The rural work includes 21,637 feet of stream bank restoration, and installation of four wetlands covering 22,997 square feet. The work also includes the planting of 5,150 herbaceous plugs and 14,103 woody plants and the installation of 2,541 feet of fencing for livestock exclusion. Results

The reader is referred to the Paradise Creek summary that appears in the 2003 annual report for more information about each of the 25 sub-projects under the urban contract and the 12 sub-projects under the rural contract. The summary contains pertinent information, including photographs of all 37 riparian restoration projects.

Hydrologic-Habitat—Rock Creek 319 Grant Closure Final Report

CONTRACT S026

Location and Uses

This project is located in Rock Creek Canyon, a site that was previously the abandoned Coates Colonial Concrete Facility in Twin Falls, Idaho, and, before that, it was a dumpsite for abandoned vehicles, garbage, and construction debris. The site now includes a city-owned recreational vehicle park that caters to travelers visiting patients in the nearby Twin Falls Hospital. Sixteen of twenty-six acres in the two parcels of land have been reclaimed. This work includes 3,300 feet of stream restoration and stabilization.

Impairments

The surface conditions were primarily broken slabs of concrete littered with cast concrete anchors and other concrete debris. This debris was covered over with a variety of weed species—mostly invasive with a few noxious species—and, when precipitation was heavy enough, the water would come off the upper slope and channel through, picking up a considerable amount of sediment and invasive weed seed. The runoff was then carried over the edge of the slope into Dead Mans Creek and Rock Creek proper, adding to the non-point pollution that empties into Rock Creek from Highway 30.

In addition, the Rock Creek stream bank had been manipulated and degraded from many years of human activity. The continuous soil disturbance had encouraged the rapid replacement of native species with invasive and noxious weeds.

Funded Projects and Results

Most of the concrete debris was removed, except for those pieces too large and deeply buried to extract. One 120′ x 80′ concrete slab remains, which is part of a man made embankment of Dead Man's Creek; it will be used as a parking lot.

Most invasive species were removed from the interior. The area of impact for improvements is the south and southwesterly boundary of Rock Creek and all of Dead Man's Creek. Conditions have been met to eliminate the majority of runoff coming through the property designated in the grant proposal.

Two settling ponds have been built to capture runoff from the four lanes of Highway 30 West. The primary settling pond is connected to the secondary one via multiple layers of porous rock and some man-made materials, mostly concrete. The secondary settling pond drains via an 8" PVC drainpipe at the apex of the water column into a gravel filter and ultimately into Dead Man's Creek and Rock Creek. About 35% of the recovered area consists of asphalt and concrete for road access, parking, and picnic shelter areas.

Outside the initial buffer area around the settling ponds, ground cover includes bluegrass and perennial ryegrass turf. This vegetation will act as large absorptive filter throughout the park. This turf area is roughly 5.6 acres, and more than 140 trees were planted in there as well. Most of the project area also functions as an inner-canyon flood plain for Rock Creek.

Manual labor was supplied via the county of Twin Falls' Juvenile Offender Program (JOP). An extensive irrigation system, minimal fertilization, and an integrated pest management program, along with the commitment of trained city staff and volunteers, maintain the health and vigor of the new recreational facility. The city plans to continue using the JOP for care and maintenance of this site.

Silviculture and Transportation Sectors – Scriver Creek Watershed Roads and Forested Lands Final Report

CONTRACTS S009/ Q564

Location and Uses

The Scriver Creek road has been a major contributor of sediment to Scriver Creek, which joins the South Fork of the Payette River at a point about four miles north of Crouch, in Boise County, for many years.

Impairments

The TMDL pollutant of concern for the South Fork of the Payette River is sediment.

Funded Projects

In 1999 and 2000, a group of stakeholders, led by Boise County, applied for and received 319 funding in two grants to reshape and apply gravel to 20 miles of Scriver Creek road, stabilize five miles of stream bank, stabilize 26 acres of hill slopes, and monitor the results of the work. Global positioning satellite survey data was collected for the entire watershed and numerous meetings between the partners, including Boise National Forest, Boise Cascade Corporation, Idaho Department of Lands, and Boise County were held. All existing roadway, culverts, and potential areas of sediment delivery to Scriver Creek were identified. Priorities were established and work began in 2000.

Results

Four stream cross-sectional transects were monitored from 2001 through 2003.The cross-sections were measured annually and photographs were taken at each transect site. WINXSPRO hydrology software was used to calculate cross sectional area and width:depth ratios.

The surveys show variable trends from each transect. Transect #1 indicates the channel is becoming narrower and deeper, transect #2 remains unchanged, and transects #3 and #4 indicate a wider and shallower stream channel. The consultant overseeing this project concludes that the three years of monitoring data is not enough time to determine if the stream channel will benefit from the work already accomplished.

Although the stream cross-sectional transects show inconclusive results, the most important result of this project is a drastic reduction of sediment erosion from Scriver Creek road and delivery to the South Fork of the Payette River. This conclusion was made after monitoring two sediment collection boxes that were installed at culverts along Scriver Road. Prior to the road and stream bank stabilization work, the collection boxes were filled with sediment after a single rain event. After the work was accomplished, only trace amounts of sediment were recorded during the entire spring runoff of 2002.

Photographs documenting sediment runoff before and after this project, along with stream cross-section monitoring data, are on file at the DEQ State Office.

Agricultural Sector – Succor Creek/Homedale School District Water Quality Project Final Report

CONTRACT #S019

Location and Uses

The Succor Creek/Homedale School District project is located in extreme northern Owyhee County, southwest of Homedale, Idaho. In the spring of 1999, the Owyhee Soil Conservation District (SCD) and the Homedale School District asked the Southwest Resource Conservation and Development (RC&D) Council for assistance in developing an agricultural wetland. The functional goal of the wetland project was to treat runoff, reducing non-point pollution from approximately 100 acres of gravity-irrigated row crop farmland. The educational goals of the project were to provide an example for local agricultural producers as well as an educational center for local area schools (there are more than 2,300 students within a ten-mile radius) to study wetland natural resources.

Impairments

The primary nutrient that impairs beneficial uses of Succor Creek is phosphorus, but sediment loading, attributable to past land management practices that have resulted in unstable banks, also contributes to the impairment of this water body.

Funded Projects

The Owyhee SCD sponsored this project to the Southwest Idaho RC&D, which coordinated the project with the Homedale School District and set up an advisory committee. Local partners included Owyhee SCD, Homedale School District, teachers, the agricultural producer, City of Homedale, CH2M Hill consultants, Campbell Tractor of Homedale, and the irrigation district. State-level partners were the Idaho Department of Agriculture, Soil Conservation Commission, Department of Environmental Quality, Department of Water Resources, Idaho Fish and Game, University of Idaho, and Boise State University. Federal-level partners were the U.S. Army Corps of Engineers, Environmental Protection Agency, U.S. Fish and Wildlife Service and the Natural Resources Conservation Service.

Planning and design was done throughout 1999 and into 2000. In 2000, the RC&D began investigating funding sources based on the preliminary information. The major funding was secured in the winter of 2000 through a DEQ 319 water quality grant; however, the actual money did not become available until late in the spring of 2001, which delayed construction until the spring of 2002. The four-acre wetland system includes two sediment basins, primary filter, shallow wetland, deep-water wetland, and a final polishing filter. This wetland was designed by the NRCS engineers to have a detention time of three days when all of the vegetation is in place and has matured. Currently, the detention time would be about one day if there were enough tailwater to pass through.

Approximately 400 feet of stream bank was stabilized on one side of Succor Creek, with nearly 1,500 cubic yards of material placed along this section of the creek. Trees, shrubs, and grasses were planted to stabilize the bank, and this stabilization has eliminated the open active sloughing of this bank of Succor Creek.

The students' role in the development was to plant all of the wetland plants in the spring of 2002 and assist in the maintenance of the site. There were approximately 50 students involved in the two days of planting and several others assisting in weed control in the fall.

Nearly all the aforementioned partners also had volunteers for the planting event. During this time, 2,200 Baltic rush, 2,200 Nebraska sedge, and 1,600 creeping spike rush were planted in the

primary filter and around the wetland. In addition, two truck loads of bulrush roots—harvested locally by Fish and Game—were planted in the wetland ponds. These plants have reproduced at phenomenal levels the last two years, and these levels are expected to continue for several years until a maximum density is reached, providing highly efficient filtering of the water.

Results

The Idaho Department of Agriculture has completed the first phase of water quality monitoring for base data. (Because the wetland had virtually no discharge in 2003, it was decided to discontinue phase two this year to evaluate any impacts the wetland is having on Succor Creek.) All the sediment and nutrients from the 90-acre farm were prevented from entering Succor Creek. On water-short years, or when irrigation sets are short due to the crop, there will be little water discharge into Succor Creek.

The Idaho Department of Agriculture will also be helping the Homedale School biology and chemistry teachers establish and conduct a long-range water-quality monitoring program.

The University of Idaho held the first of two Project WET (Water Education for Teachers) seminars. Several teachers from surrounding schools participated in this learning session, during which students collect and study water samples from each cell of the wetland, along with vegetation, macro-invertebrates, and wildlife. Students are using this outdoor classroom now and are planning further improvements for study, including goose-nesting platforms, bat boxes, and an area to hold outdoor classrooms. Surrounding schools are planning to start using this center in the spring of 2004.

Hydrologic-Habitat Modification Sector – Thomas Fork Watershed Streambank Stabilization Project Final Report

CONTRACT #S016

Location and Uses

The Thomas Fork Watershed encompasses 150,100 acres of Idaho and Wyoming, straddling the southeastern corner of Bear Lake County, Idaho, and western Lincoln County, Wyoming. The Sublette bounds Thomas Fork Valley on the east and the Pruess range bounds it on the west. The headwaters reside in Wyoming, as Salt Creek, which changes into Thomas Fork Creek once over the Idaho border. From there, Thomas Fork Creek meanders twenty-seven river miles through Bear Lake County to the confluence of the Bear River, emptying into Bear Lake, which has been designated a "special resource" water by the Idaho Legislature.

Agricultural practices represent the greatest use of the valley, with recreation playing a lesser role. Over 90% of the land is planted in harvest crops, such as alfalfa and grain, while the rest is used for dairies and grazing. Irrigation canals traverse the valley floor, providing necessary water to agricultural operations.

Impairments

This same principle used with the irrigation canals was applied to Thomas Fork to expedite water delivery to downstream users: meander bends were removed in certain segments in an effort to provide increased efficiency in water conveyance. Straightening the channel, however, increased the head gradient in the stream, which compounded water quality problems from the stream channel to the streambanks.

An additional source of water quality degradation is the lack of riparian vegetation due to improper grazing techniques along many parts of Thomas Fork. Riparian vegetation acts as a buffer strip to remove nutrients from the water, stabilize the soil, and shade the stream. Without this buffer strip, overland erosion is accelerated, nutrient uptake at the root zone is decreased, and the lack of shade increases the temperature of the water.

With no root zone to retain the soil in place, the angle of the bank is increased to near vertical. Because survival of vegetation is directly correlated to the slope of a stream bank, as the angle of a bank is increased vegetation establishment is decreased.

Funded Projects

Nonpoint source § 319 grants have been awarded to the Bear Lake Regional Commission to assist landowners along Thomas Fork Creek implement Best Management Practices over seven years. These practices have resulted in over 11,000 linear feet of stream bank held in place by applying treatments, including bank shaping, revetments, rip-rap, bank barbs and vegetation.

Results

These projects have proven successful on a number of levels. Treatments applied have retained soil in place for seven years, and photo monitoring of strategic locations has verified this.

Cross sectional surveys of the stream have shown the benefit of stabilizing the banks with BMPs. Results from monitoring indicate that for each foot of treated stream bank, 50 cubic feet of stream bank material was retained on the banks over a three-year period. This retained material, when expanded to the entire treated area, equals over 500,000 cubic feet of material retained in place.

Further success has been noted in landowner perceptions of treatments. Many landowners were skeptical of BMPs implemented on neighboring lands, but those perceptions have changed as projects stabilize land and enhance values. Because landowners and other sources help provide the labor and materials necessary for a successful project, this cooperative spirit is crucial to the success of these projects.

The success of bank stabilization work on the Thomas Fork comes from a combination of factors, none of which can succeed alone. The cooperation between the Department of Environmental Quality and local landowners provides a strong foundation for successful implementation: money provided by the state allows construction to proceed, while the landowner ensures success by proper management. Both entities benefit through improved water quality and stabilized soil.

The Bear Lake Regional Commission has been pleased to sponsor these projects and act on behalf of the landowners in carrying out implementation of Best Management Practices. It would be the hope of the regional commission board members that this relationship will continue for years to come, until Thomas Fork Creek is once again classified as "fishable and swimmable."

Agricultural Sector – Winchester Lake Watershed 319 Nonpoint Source Project Final Report

CONTRACT #Q610

Location and Uses

Winchester Lake, located 30 miles southeast of Lewiston, Idaho, is prized for its visual beauty and recreational value. The 75-acre lake, the focal point for Winchester Lake State Park, is used extensively by boaters, fishermen, and waders, receiving up to 37,000 visitors per year.

Impairments

Poor water quality has recently become a significant problem in Winchester Lake, the result of high phosphorus levels, which cause algae blooms, poor water clarity, and low dissolved oxygen for fish. The source of this phosphorous contamination includes fertilizers, land development, improper grazing techniques, dirt roads, and other agricultural activities adjacent to the lake and throughout the Upper Lapwai Creek watershed.

The effects of phosphorus are exacerbated by the natural warming/cooling cycles experienced by lakes. During spring and summer months, sunlight and warm air temperature heat the surface water of a lake. Cold water, due to its higher density, is heavier and sinks to the bottom, creating a condition called *thermal stratification*, in which the warm and cool layers of water don't mix. In the warm surface water, sunlight allows tiny plants to grow. As these plants die and sink, their decomposition uses up the oxygen in the deeper cool water (called the hypolimnion). Throughout the summer, oxygen levels in the hypolimnion continue to decline until no oxygen is present (anoxic conditions). This oxygen depletion, combined with warm water in the lake's upper layers, reduces the volume of the water in the lake that supports cold-water fishery to less than 16 percent of the total lake volume. Additionally, these periods of oxygen depletion allow the release of phosphorus from lake sediments into the waters of the hypolimnion.

During the fall, colder air temperatures cool the lake's surface waters. When surface water becomes cooler than deep water, the surface water sinks and the lake "turns over." This turnover allows the high concentrations of phosphorus in the hypolimnion to mix throughout the lake. The lake is thus fertilized for abundant plankton growth to occur the next summer, and cycle is repeated.

Funded Projects

As it became clear that cleaning up the Winchester Lake would require cooperation from farmers, Idaho Fish and Game, homeowners, the Nez Perce Indian Tribe, and Lewis County, several projects were designed and funded:

The Nez Perce Tribe (NPT) Water Resources and Forestry staff conducted a site visit with the contractor in September 2000 and formulated restoration options for two stream segments along Lapwai Creek. The work included installation of a gate to restrict livestock access and realignment of a new fish-friendly culvert. Rolling dips and buffer strips of grass were added to a portion of the road leading to Winchester Lake shoreline.

Along road Segment 2 (the section between Mud Springs Reservoir and Talmaks Reservoir), out-sloped roads with new rolling dips, one culvert, two gates, graveled surface, and mulched and seeded shoulders were completed. All of this work was done in 2000.

In 2001, NPT Water Resources staff, volunteers, participating landowners, and the Salmon Corps planted 2,500 trees and shrubs, including Douglas spirea, redozier dogwood, Douglas hawthorn, coyote willow, Drummond willow, Mackenzie willow, quaking aspen, serviceberry, paper birch,

and Sitka alder. The area where plants were placed was cleared with hodags prior to planting, and compost was placed in holes. Tree protectors were staked around plantings. Plants were placed, according to species requirements for moisture and sunlight, within approximately 30 feet of the creek.

Work in a low-meadow campground adjacent to Upper Lapwai Creek included installation of contained steel campfire units to reduce nutrient loading during spring runoff. Six campfire grills were purchased for the Mud Springs Association Campground. The grills were designed and manufactured locally for a reduced price.

Stabilization of the Wolf Center access road included road surface hardening with coarse foundation rock and reshaping the inside ditch. Four rolling dips and five water bars were installed for water conveyance. Finally, a base rock application was installed in spring of 2002.

Beginning in the summer of 2003, the Idaho Department of Fish and Game teamed with the Department of Environmental Quality and implemented a project to directly attack the algae buildup in the lake. Many options were carefully considered for reducing the amount of phosphorous in the lake, including aeration, chemical treatment, dredging, and hypolimnetic water withdrawals. After considering factors, such as cost, public input, and environmental impacts, hypolimnetic aeration was determined to be the best option.

The Idaho Department of Fish and Game matched 319 grant funds to install eight aeration units in the deeper areas of Winchester Lake during the summer/fall of 2002. These units take water from the bottom of the lake, bringing it to the surface where it is oxygenated by contact with air, then returned to the bottom of the lake. By increasing the level of oxygen in the hypolimnion, the amount of phosphorous that can be released into the water is reduced, thereby reducing the amount of "fertilizer" available for algae. This in turn reduces the loss of oxygen in the hypolimnion due to decomposition, breaking the cycle. (Less algae buildup also means clearer water.)

Water is brought up from the bottom of the lake through the action of a compressor, which releases air at the bottom of a vertical pipe. As the air rises, it forces water up the pipe into an attached trough. As the level of the water increases in the trough, gravity forces water back down a second pipe to the bottom of the lake.

Each unit is approximately 10' x 10' and covered with a low A-frame roof. The air compressors are housed in sheds on the opposite side of the lake from the park and campground to reduce noise pollution in those areas. The units were turned on in early Summer 2003, and the summer and fall were then spent troubleshooting and fine-tuning the aeration system, which is currently running at full capacity and scheduled to operate for five years.

Results

Monitoring in Winchester Lake and Upper Lapwai Creek is ongoing to document improved conditions for salmonids and beneficial use support due to implementation of BMPs in the watershed. It is hoped that, over time, aquatic habitat and water quality will improve because of projects such as those described above, which promote meeting the loading targets of the TMDL established in 1999 for Upper Lapwai Creek.

Department of Environmental Quality
1410 North Hilton
Boise, ID 83706